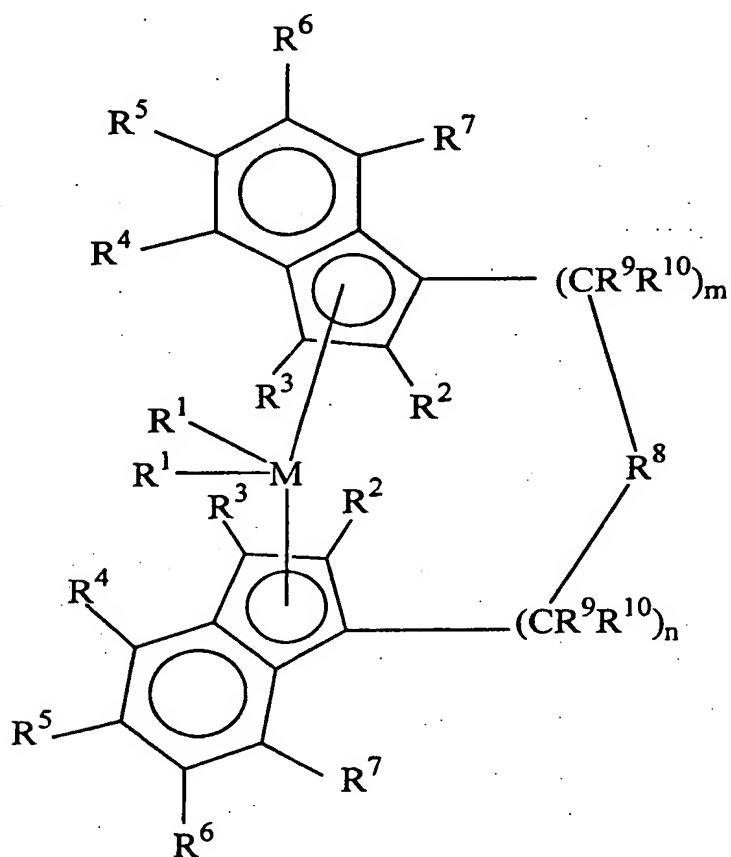


CLAIMS

What is Claimed Is:

1. A process for preparing a propylene copolymer, the process comprising:
- 5 polymerizing propylene and a comonomer selected from C2 and C4-C10 in the presence of the product of activator and metallocene compound represented by the formula:



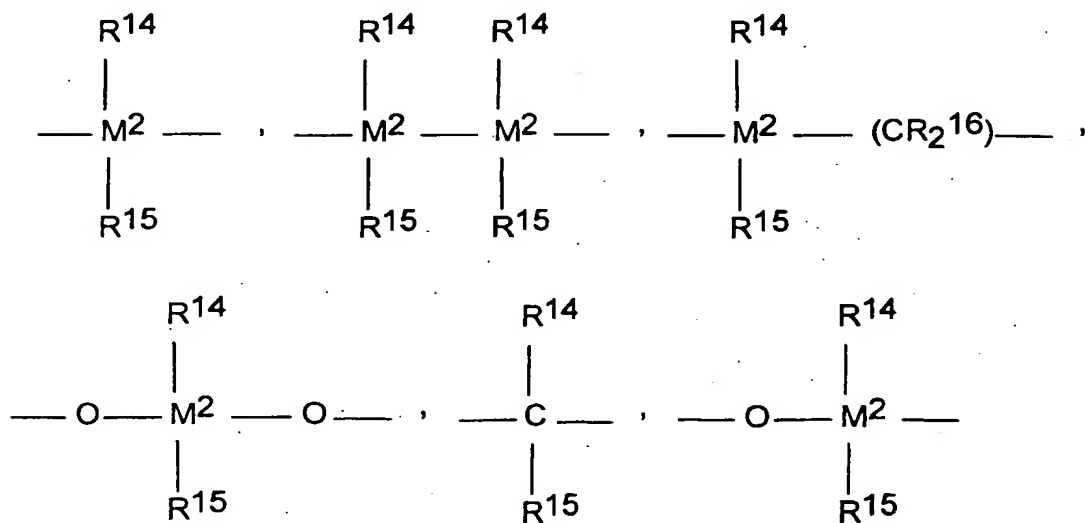
wherein: M is a metal of Group 4, 5, or 6 of the Periodic Table,

- 10 R¹ are identical or different, and are one of a hydrogen atom, a C1-C10 alkyl group, a C1-C10 alkoxy group, a C6-C10 aryl group, a C6-C10 aryloxy group, a C2-C10 alkenyl group, a C7-C40 arylalkyl group, a C7-C40 alkylaryl group, a C8-C40 arylalkenyl group, a halogen atom, or a conjugated diene, said conjugated diene substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl or
- 15 tri(hydrocarbyl)silylhydrocarbyl groups, and said diene having up to 30 atoms not counting hydrogen;

R2 are identical or different, and are a hydrogen atom, a halogen atom, a C1-C10 alkyl group, a halogenated C1-C10 alkyl group, a C6-C10 aryl group, a halogenated C6-C10 aryl group, a C2-C10 alkenyl group, a C7-C40 arylalkyl group, a C8-C40 arylalkenyl group, a -NR₂₁₇ radical, a -SR₁₇ radical, a -OR₁₇ radical, a -OSiR₃₁₇ radical, or a -PR₂₁₇ radical, wherein: R₁₇ is one of a halogen atom, a C1-C10 alkyl group, or a C6-C10 aryl group;

R3 are as defined for R1;

R8 is hydrogen or:



wherein: R₁₄, R₁₅ and R₁₆ are identical or different, and are a hydrogen, a halogen, a C1-C20 branched or linear alkyl group, a C1-C20 fluoroalkyl, a silylalkyl group, a C6-C30 aryl group, a C6-C30 fluoroaryl group, a C1-C20 alkoxy group, a C2-C20 alkenyl group, a C7-C40 arylalkyl group, a C8-C40 arylalkenyl group, a C7-C40 alkylaryl group, or R₁₄ and R₁₅, together with the atoms binding them, form a cyclic ring;

M₂ is carbon;

R₉ and R₁₀ are identical or different, and have the meanings stated for R₁;

R₄, R₅, R₆ and R₇ are identical or different, and have the meanings stated for R₁ provided that at least one of R₄ and R₇ are not hydrogen; and

m and n are identical or different, and are zero, 1 or 2.

2. The process of claim 1 wherein M is zirconium or hafnium, and R2 are hydrogen.

3. The process of claim 1 wherein M is zirconium or hafnium, and R2 and R3
5 are hydrogen.

4. The process of claim 1 wherein R14, R15 and R16 are hydrogen or a C1-C4 alkyl group.

10 5. The process of claim 1 wherein R8 is hydrogen, and m and n are 1.

6. The process of claim 1 wherein R5 and R6 are hydrogen, R9 and R10 are hydrogen, and R4 and R7 are identical, and are one of a fluorine, a chlorine, a bromine, a C1-C4 alkyl group, or a C6-C10 aryl group.

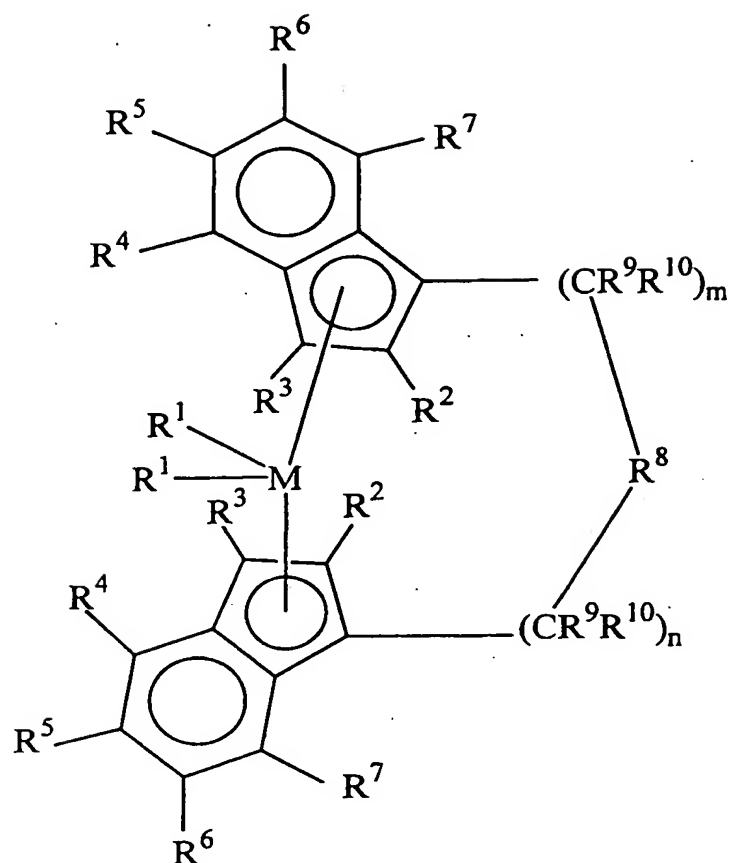
15 7. The process of claim 1 wherein the comonomer is ethylene.

8. The process of claim 1 wherein the polymer contains at least 75 weight percent propylene derived units, based on the total weight of the copolymer.

20 9. The process of claim 1 wherein the metallocene compound is a single species.

10. The process of claim 1 wherein the process is a single step polymerization
25 process conducted in a single reactor.

11. A process for preparing a propylene copolymer composition comprising:
polymerizing propylene and a comonomer selected from C2 and C4-C10 in the
presence of a the product of activator and metallocene compound represented by
30 the formula:



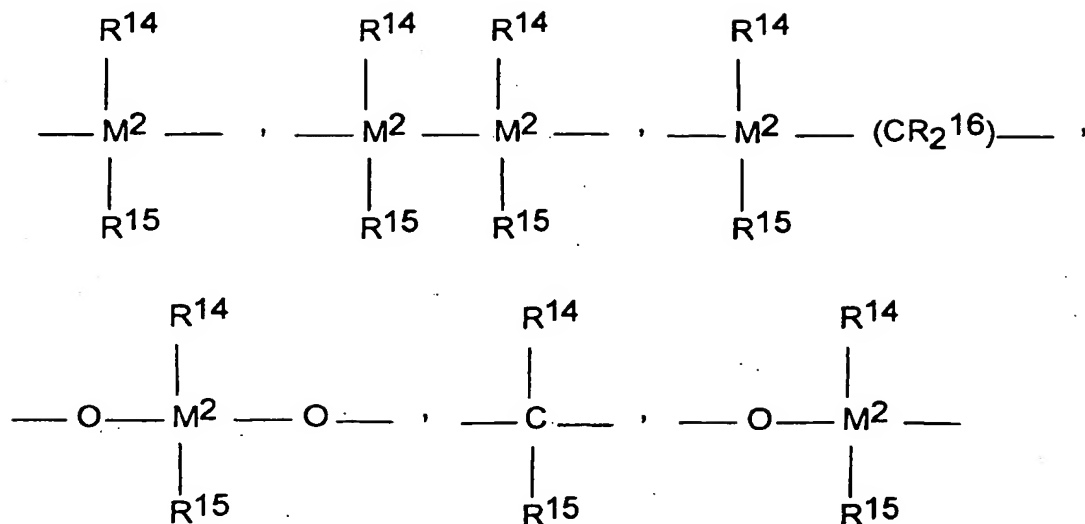
wherein: M is a metal of Group 4, 5, or 6 of the Periodic Table,

R₁ are identical or different, and are one of a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a C₆-C₁₀ aryl group, a C₆-C₁₀ aryloxy group, a C₂-C₁₀ alkenyl group, a C₇-C₁₀ arylalkyl group, a C₇-C₄₀ alkylaryl group, a C₈-C₄₀ arylalkenyl group, a halogen atom, or a conjugated diene, said conjugated diene substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl or tri(hydrocarbyl)silylhydrocarbyl groups, and said diene having up to 30 atoms not counting hydrogen;

R₂ are identical or different, and are a hydrogen atom, a halogen atom, a C₁-C₁₀ alkyl group, a halogenated C₁-C₁₀ alkyl group, a C₆-C₁₀ aryl group, a halogenated C₆-C₁₀ aryl group, a C₂-C₁₀ alkenyl group, a C₇-C₁₀ arylalkyl group, a C₈-C₄₀ arylalkenyl group, a -NR₂₁₇ radical, a -SR₁₇ radical, a -OR₁₇ radical, a -OSiR₃₁₇ radical, or a -PR₂₁₇ radical, wherein: R₁₇ is one of a halogen atom, a C₁-C₁₀ alkyl group, or a C₆-C₁₀ aryl group;

R3 are as defined for R1;

R8 is hydrogen or:



wherein: R14, R15 and R16 are identical or different, and are a hydrogen, a
 5 halogen, a C1-C20 branched or linear alkyl group, a C1-C20 fluoroalkyl, a
 silylalkyl group, a C6-C30 aryl group, a C6-C30 fluoroaryl group, a C1-C20
 alkoxy group, a C2-C20 alkenyl group, a C7-C40 arylalkyl group, a C8-C40
 arylalkenyl group, a C7-C40 alkylaryl group, or R14 and R15, together with the
 atoms binding them, form a cyclic ring;

10 M2 is carbon;

R9 and R10 are identical or different, and have the meanings stated for R1;

R4, R5, R6 and R7 are identical or different, and have the meanings stated for R1
 provided that at least one of R4 and R7 are not hydrogen; and

m and n are identical or different, and are zero, 1 or 2.

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12. The process of claim 11 wherein M is zirconium or hafnium and wherein
 R2 are identical or different C1-C4 alkyl groups.

13. The process of claim 11 wherein M is zirconium or hafnium, wherein R2
 20 are identical C1-C4 alkyl groups, and wherein R3 are hydrogen.

14. The process of claim 11 wherein R14, R15 and R16 are identical and are a C1 -C4 alkyl group.

15. The process of claim 11 wherein R8 is hydrogen, and m and n are 1.

16. The process of claim 11 wherein R5 and R6 are hydrogen, R9 and R10 are hydrogen, and R4 and R7 are identical and are a fluorine, a chlorine a bromine, a C1-C4 alkyl group, or a C6-C10 aryl group.

17. The process of claim 11 wherein the comonomer is ethylene.

18. The process of claim 11 wherein the composition contains at least 75 weight percent propylene derived units based on the total weight of the composition.

19. The process of claim 11 wherein the metallocene compound is a single species.

20. The process of claim 11 wherein the process is a single step polymerization process conducted in a single reactor.

21. A propylene copolymer produced by the process of claim 1.

22. A propylene copolymer composition produced by the process of claim 11.

23. The propylene copolymer of claim 21, comprising:

- a) at least 50 wt% units derived from propylene; and
- b) a ratio of two g's as determined by the formula:

$$\frac{g_{88-98}}{g_{20-60}} \geq 1.10$$

where the subscripts, 88-98 and 20-60, refer to the wt% of copolymer eluted in GPC-DRI, and in the numerator and the denominator, g' is the weight average g' over the elution range designated 88-98 and 20-60, respectively.

5 24. The propylene copolymer of claim 23 wherein the ratio of two g's is equal to or greater than 1.30.

25. The propylene copolymer of claim 23 having from 2 wt% to 28 wt% comonomer derived units, based on the total weight of the copolymer.

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26. The propylene copolymer of claim 23 having from 2 wt% to 28 wt% ethylene derived units, based on the total weight of the copolymer.

15 27. The propylene copolymer of claim 23 having from 6 wt% to 28 wt% comonomer derived units, based on the total weight of the copolymer.

28. The propylene copolymer of claim 23 having from 6 wt% to 28 wt% ethylene derived units, based on the total weight of the copolymer.

20 29. A propylene copolymer comprising:

- a) at least 50 wt% units derived from propylene, and from 2 wt% to 28 wt% units derived from ethylene, based on the total weight of the copolymer; and
- b) a ratio of two g's as determined by the formula:

$$\frac{g_{88-98}}{g_{20-60}} \geq 1.10$$

25 where the subscripts, 88-98 and 20-60, refer to the wt% of copolymer eluted in GPC-DRI, and in the numerator and the denominator, g' is the weight average g' over the elution range designated 88-98 and 20-60, respectively.